

Advanced Flange System

Project Number: 97-11

Investigator: J. Nichols/EP82

Purpose

The purpose of this effort is to develop a flange system that is conducive to installation and maintenance. The flange system should minimize residual stress upon bolt-up and have sealing tolerances which exceed the propellant feed line stack-up tolerance. The seal should be capable of greater fill of the mating surface and eliminate the need for highly polished sealing surfaces which are easily scratched.

Background

Flanged connections in propulsion systems, i.e., engines and feed lines, represent the primary leak path for hazardous gas release. The tight tolerances held on flange misalignment and surface finish of seal surface represent a significant cost and maintenance element for most systems. An alternative would be to develop a flange system which allows for misalignment and provides sufficient sealing against leakage.

Approach

The flange system concepts to be evaluated were selected from three candidate fields: A commercial design taking advantage of innovation inside the pipe and fitting industry; a developmental aerospace contractor design which utilizes the experience base for the unique environments which are develop on space flight vehicles; and a developmental design from the Marshall Center Propulsion Laboratory that is committed to the development of hardware which will reduce the cost and improve the safety of future space flight vehicles. The flanges will be tested to evaluate and compare performance characteristics. The

parameters such as misalignment, leakage, sensitivity to surface finish and flaws will be quantified, and the desirable design features will be extracted and synthesized in a new flange design concept.

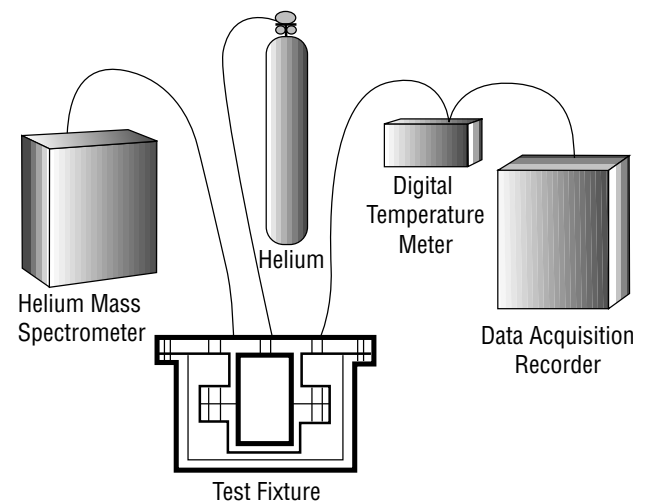


FIGURE 19.—Test setup.

Accomplishments

- In-house hardware detail drawings complete
- Commercial flange procurement funds obligated
- Aerospace contractor procurement funds committed.

Planned Future Work

- Manufacture candidate flanges
- Perform leak test (ambient to 170 degree environments).

Funding Summary (\$k)

FY97

Authorized:	70
Obligated:	64.5

Status of Investigation

Project Approval—October 1, 1996
Estimated Completion—January 1999

To be continued in FY98 with additional FY98 funding of 70k.